

Abstract

The Intake of Sucrose but Not of the Intense Sweetener Sucralose Is Associated with Postprandial Endotoxemia in Healthy Young Adults [†]

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Abstract: Background and objectives: Similar to saturated fat, a diet rich in sugar may contribute to the development of overweight and obesity and associated metabolic diseases, like type 2 diabetes and metabolic dysfunction associated steatotic liver disease (MASLD). Herein, effects on intestinal microbiota composition and barrier function subsequently leading to an increased translocation of bacterial endotoxin and activation of Toll-like receptor (TLR) 4-dependent signaling cascade are discussed to be critical. In recent years, the use of artificial sweeteners to sweeten food and beverages has markedly increased despite a still limited knowledge on health effects. Results of animal studies suggest that an extended intake of sweeteners like sucralose may alter intestinal microbiota composition and gut barrier function when consumed at high levels. In the present pilot study, we assessed the effects of an acute intake of sucrose and the artificial sweetener sucralose in physiological relevant doses in beverages on postprandial endotoxemia in healthy, normal-weight young adults. Methods: A total of 11 men and women aged 24–31 year were enrolled in this randomized placebo controlled single-blinded study in cross-over design which was approved by the ethics committee of the University of Vienna (Clinical trial: NCT04788680). After an initial blood collection and a 2 day nutritional standardization, according to the recommendations of the German, Austrian and Swiss (DACH) nutritional societies, and a second fasted blood collection, participants consumed either a beverage containing sucrose (110 g), sucralose (180 mg, iso-sweet) or an isocaloric combination of sucralose (180 mg) + maltodextrin (110 g) in a randomized order along with a standardized breakfast. Blood was collected 1, 2 and 3 h after consumption of the beverage. Bacterial endotoxin levels in plasma were measured using LAL assay. Results: After nutritional standardization, bacterial endotoxin levels were significantly lower than before. Furthermore, 2 h after the intake of the sucrose sweetened beverage, bacterial endotoxin levels were significantly higher in plasma compared to baseline levels. A similar increase in bacterial endotoxin levels in plasma was not detected after the intake of the beverage sweetened with sucralose. Discussion: Our data suggest that the intake of a sucrose but not sucralose sweetened beverage results in post-prandial endotoxemia.

Keywords: sucrose; sucralose; intestinal permeability



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